

Claims

What is claimed is:

- [c1] A hammer drill for boring through providing rotational forces and percussive forces to a drill bit, comprising:
 - a motor;
 - a connector shaft driven rotationally by said motor;
 - a spindle capable of holding said drill bit, wherein the rotational force through said connector shaft is propagated;
 - a motion converter mechanism for converting the rotational force of the said connector shaft to a reciprocating force in the axial direction in said spindle;
 - a percussive member for applying a percussive force in the axial direction to the drill bit held in said spindle based on the reciprocating force converted by said motion converter mechanism, and
 - a percussive force converter mechanism for converting percussive forces from said percussive member through changing the rotational speed ratio of said motor and said connector shaft.
- [c2] A hammer drill according to claim 1, wherein said percussive force conversion means is a transmission mechanism disposed between said motor and said connector shaft, where, in said transmission mechanism, one of multiple gears with mutually differing numbers of gear teeth, which receive the rotational force from said motor in order to rotate, and which can move freely in the axial direction of said connector shaft, are selectively meshed, by the force off a spring, to gear teeth equipped on said connector shaft side.

- [c3] A hammer drill according to claim 2, wherein the teeth of the gear that mates with the gear teeth of said connector shaft side are provided with sidewalls on one side in the axial direction thereof.
- [c4] A hammer drill according to claim 2, wherein either the gear teeth on said connector shaft side, or the mating teeth of said gear that meshes with said gear teeth, have different axial-direction lengths on alternating teeth.
- [c5] A hammer drill according to claim 2, wherein either the gear teeth on said connector shaft side, or the mating teeth of said gear that meshes with said gear teeth, are provided every other tooth.
- [c6] A hammer drill according to claim 2, wherein a sleeve is affixed to said connector shaft, where said sleeve is equipped with a spring that provides a force on said gear.
- [c7] A hammer drill according to claim 2, wherein said transmission mechanism is provided with a shifting shaft between a pair of gears, wherein, when said shifting shaft is moved in the axial direction of said connector shaft to remove one gear; against the force of the spring, away from the gear teeth of said connector shaft side, the other gear is moved by the force of a spring to a position wherein it meshes with the gear teeth on the connector shaft side.
- [c8] A hammer drill according to claim 7, wherein said shifting shaft is equipped in a position that is off-center relative to the center of rotation of a shifting switch on the axis of said connector shaft.
- [c9] A hammer drill according to claim 7, wherein said pair of gears is equipped with a specific gap in the axial direction of said connector shaft, and a space for obtaining a neutral state, wherein neither gear meshes with the gear teeth on said connector shaft side, is formed between said pair of gears.

[c10] A hammer drill according to claim 9, wherein the equilibrium positions of the springs that provide forces onto each of the gears of said pair of gears is in the position of said neutral state.